
**INTERIM ACTION REPORT
FENCED AREA CLEANUP
EVERETT SMELTER SITE**

Public Review Draft

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1.0 PURPOSE AND GENERAL REQUIREMENTS

The Washington Department of Ecology (Ecology) has issued an enforcement order (#02TCPNR-4059) to ASARCO Incorporated (Asarco) to perform an interim action to address the area of the former Everett smelter designated as the fenced area (see Figures 1-1 and 1-2). Within the fenced area, Ecology is requiring Asarco to remove soil and former smelter debris with arsenic concentrations greater than 3,000 mg/kg arsenic. Removal is required to begin no later than April 30, 2003 and be completed by October 30, 2004. Ecology is not requiring Asarco to perform any other actions at the Everett smelter under this enforcement order.

Asarco and Ecology have discussed an approach that would allow Asarco to meet the conditions of the enforcement order under this schedule and that will allow the work to be performed with significant cost savings. Asarco's plan to perform this work at Everett utilizes the former Tacoma smelter, a Superfund site that is also being remediated under EPA oversight. At the Tacoma smelter, a much larger amount of the same type of material that is present at Everett (i.e., source area material) is being excavated and disposed of at the smelter in an On-site Containment Facility (OCF). The OCF has been constructed to exceed RCRA Subtitle C standards for hazardous waste landfills in order for the source area materials to be disposed there without further treatment. The capacity of the OCF is 260,000 cubic yards (CY) and the current estimate of the quantity of material from the Tacoma smelter that will be disposed of in the OCF is about 210,000 CY. The remaining capacity of the OCF at Tacoma is available to dispose of the same type of material from Everett within the fenced area. This volume has been estimated to be about 25,000 CY, less than 10% of the amount of material that will be disposed of from Tacoma and within the remaining capacity of the OCF.

The key elements of the approach Asarco is prepared to implement for removal of the fenced area material at Everett are:

- The material greater than 3,000 mg/kg arsenic within the fenced area will be removed and transported to the Tacoma smelter for disposal in the OCF without treatment.
- Material less than 3,000 mg/kg arsenic will also be removed from the fenced area, transported to Tacoma, and placed beneath the Tacoma Smelter site-wide cap along with other soils from the cleanup of residential yards in Ruston and north Tacoma.
- Asarco will backfill and grade the fenced area with clean material following remediation and proceed with redevelopment of its property. At the completion of remediation, Asarco will revegate and provide for storm water, erosion, and sediment control at the site.

There are three key conditions needed to perform the cleanup of the fenced area:

- ✓ Asarco will prepare an Interim Action Report (IAR – this document) consistent with MTCA requirements. Ecology will have to approve this IAR.
- ✓ EPA and Ecology will have to approve the transportation of material to the Tacoma smelter and the disposal of soil and debris with concentrations greater than 3,000 mg/kg arsenic in the OCF without treatment.
- ✓ Favorable support from the communities of Ruston and Tacoma will be necessary to dispose of material from Everett at the former Tacoma smelter.

Asarco may also remediate the residential properties immediately adjacent to the fenced area and within the boundary of property historically owned by Asarco (see Figure 1-2). If Asarco decides to proceed with this phase of cleanup, the work will be conducted per the provisions of the FCAP applicable to residential properties (see Section 3.5).

Interim actions are regulated under WAC 173-340-430 and are intended to partially address the cleanup of a site, although they may constitute the entire cleanup if they comply with applicable requirements (WAC 173-340-430 (1)). WAC 173-340-430 (2) describes the general requirements of interim actions. WAC 173-340-430 (3) (a) goes on to require the

interim action to be performed consistent with the ultimate cleanup action if it has been selected. WAC 173-340-430 (4), (5), and (6) establish the requirements for timing of the interim action, the administrative options which allow interim actions (i.e., enforcement order #02TCPNR-4059), and public participation, respectively. Submittal requirements for the IAR are stated in WAC 173-340-430 (7) and construction provisions are subject to WAC 173-340-430 (8).

1.1 CLEANUP STANDARDS

In accordance with WAC 173-340-430 (2), interim actions may (a) achieve cleanup standards for a portion of the site; or (b) provide a partial cleanup, that is, clean up hazardous substances from all or part of the site, but not achieve cleanup standards; or (c) provide a partial cleanup of hazardous substances and not achieve cleanup standards for a cleanup. WAC 173-340-430 (3)(a) requires the interim action to be performed consistent with the selected final cleanup action (i.e., the FCAP).

Cleanup standards for the Everett site have been established in the FCAP. The FCAP contains cleanup standards for soil, groundwater, surface water, and storm drain sediment in these areas of the site. Cleanup standards consist of both cleanup levels and points of compliance. This IAR has been prepared to comply with these requirements and is focused on remediation of the fenced area consistent with the enforcement order. Remediation of the residential properties adjacent to the fenced area will be conducted per the requirements and specifications of the FCAP if Asarco remediates these residential properties.

1.1.1 Soil

The FCAP established the following soil cleanup levels for residential land which are shown in Table 1-1:

TABLE 1-1. SOIL CLEANUP LEVELS

Chemical	Cleanup Level (mg/Kg)
Arsenic	20
Lead	353
Cadmium	80
Antimony	32
Mercury	24
Thallium	5.6

The point of compliance for soil will be the existing ground surface to a depth of 15 feet below the ground surface for direct contact with soil and throughout the site for protection of surface and ground water.

1.1.2 Groundwater

The established cleanup levels consist of acute and chronic levels for groundwater and are shown in Table 1-2. The FCAP states that the groundwater is not present in sufficient quantity to serve as a drinking water supply and that the City of Everett has no plans to use groundwater from the fenced area in the future.

TABLE 1-2. GROUNDWATER CLEANUP LEVELS

Chemical	Cleanup Level	
	Acute Level (ug/L)	Chronic Level (ug/L)
Arsenic	360 (c)	190 (d)
Lead (dd)	(q,c)	(r,d)
Cadmium (dd)	(i,c)	(j,d)
Mercury (s,ff)	2.4 (c)	0.012 (d)

- (c): A 1-hour average concentration not to be exceeded more than once every three years on the average.
- (d): A 4-day average concentration not to be exceeded more than once every three years on average.
- (i): $\leq (0.865)(e^{(1.28[\ln(\text{hardness})]-3.828)})$
- (j): $\leq (0.865)(e^{(0.7852[\ln(\text{hardness})]-3.49)})$
- (q): $\leq (0.687)(e^{(1.273[\ln(\text{hardness})]-1.46)})$
- (r): $\leq (0.687)(e^{(1.273[\ln(\text{hardness})]-4.705)})$
- (s): If the 4-day average chronic concentration is exceeded more than once in a three-year period, the edible portion of the consumed species should be analyzed. Said edible tissue concentrations shall not be allowed to exceed 1.0 mg/Kg of methylmercury.
- (dd): These ambient criteria are based on the dissolved fraction (for cyanide criteria using the weak and dissociable method) of the metal. The department shall apply the criteria as total recoverable values to calculate effluent limits unless data is made available to the department clearly demonstrating the seasonal portioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is made available to the department clearly demonstrating the effective use of the water effects ration approach established by USEPA *Water Quality Standards Handbook*, December 1998e, as supplemented or replaced. Information which is used to develop effluent limits based on applying metals portioning studies or the water effects ration approach shall be identified in the permit fact sheet developed pursuant to WAC 173-220-060 or 173-226-110, as appropriate, and shall be made available for the public comment period required pursuant to WAC 173-220-050 or 173-226-130(3), as appropriate.
- (ff): These criteria are based on the total-recoverable fraction of the metal.

Antimony and thallium do not have standards listed. However, the FCAP states that these chemicals should not be above natural background levels in the state.

Because it is anticipated that some hazardous substances will remain on-site above the cleanup levels (i.e., soils > 150 mg/Kg arsenic under a minimum of 2 ft. of backfill), a conditional point of compliance is to be as close as practicable to the source of these substances. The point of compliance for groundwater shall be a conditional point of compliance located at any receiving surface water body in the Upland Area (such as ditches, springs, or other surface water flows) and at the Upland Area boundary, where groundwater flows into the Lowland Area.

1.1.3 Surface Water

Because it is believed that the surface water in the fenced areas reports to the City of Everett's combined sewer storm water system and subsequently to the wastewater treatment plant, the City of Everett's pretreatment criteria will be the cleanup levels. The applicable surface water cleanup levels are shown in Table 1-3.

TABLE 1-3. SURFACE WATER CLEANUP LEVELS

Chemical	Cleanup Level (ug/L)
Arsenic	500
Lead	1890
Antimony	No criteria
Cadmium	240
Mercury	100
Thallium	No criteria

The point of compliance for surface water is set such that identification of potential water quality problems anywhere in the area affected by the interim action may be evaluated by sampling the water at the location of concern and comparing the quality of the water with the

cleanup levels. However, surface water will be controlled during the interim action and specific points of compliance designated.

1.1.4 Storm Drain Sediment

The applicable cleanup levels for storm drain sediment are shown in Table 1-4.

TABLE 1-4. STORM DRAIN SEDIMENT CLEANUP LEVELS

Chemical	Cleanup Level (mg/Kg)
Arsenic	20
Lead	250
Cadmium	2
Antimony	32
Mercury	1
Thallium	5.6

The point of compliance for storm drain sediment will be each cleanout point and at any point where sediment discharges from the storm sewer system.

1.1.5 Indicator Hazardous Substances and Remediation Levels

The six chemicals of concern (arsenic, lead, cadmium, antimony, mercury, and thallium) that have been identified in the FCAP must be monitored for in groundwater, surface water, and storm drain sediment because data regarding the correlation are not sufficient to eliminate any of them from consideration. However, arsenic will be the only indicator chemical for soil because the cleanup of arsenic in soil is expected to result in the cleanup of the other five chemicals.

In addition, for soil, remediation levels have been established in the FCAP that vary from the cleanup levels. For soil removed from typical residential lands, the remediation levels are shown in Table 1-5.

TABLE 1-5. SOIL REMEDIATION LEVELS

Depth	Average Arsenic (mg/Kg)	Maximum Arsenic (mg/Kg)
0-1 feet	20	40
1-2 feet	60	150
2-15 feet	150	500

The average remediation levels will be compared with the composite sample results. The maximum remediation levels will be compared with the discrete sample results, if analysis of discrete samples is required.

Two other soil remediation levels have been established in the FCAP. The first is for gardens at residential properties. At gardens, the remediation levels are an average of 20 mg/Kg and a maximum of 40 mg/Kg for arsenic concentrations to a depth of 18 inches rather than 12 inches. Another remediation level is for maintenance areas not normally occupied (crawl spaces). At these areas, the remediation level is an average of 200 mg/Kg for arsenic concentrations from a composite surface sample.

Locations with soil containing arsenic below the applicable remediation level but above the cleanup level or containing contaminated soil beneath inaccessible areas such as driveways will be subject to institutional controls and confirmational monitoring.

The criteria in Table 1-5 are applicable to the fenced area under the cleanup plan described in this IAR. Specifically, Asarco plans to remove two categories of material from the fenced area: above 3,000 mg/Kg arsenic and above 150 mg/Kg but less than 3,000 mg/Kg arsenic. After removal of this material, the fenced area will be backfilled with at least two feet of clean material to meet the soil cleanup requirements of Table 1-5 above. As such, the result of the interim action will be that soils in the fenced area will satisfy the FCAP requirements for remediation of residential property.

1.2 RELATIONSHIP TO THE FINAL CLEANUP ACTION PLAN

WAC 173-340-430 (2)(b)(i) states that if the cleanup action is known, the interim action shall be consistent with the cleanup action. Therefore the basis of this interim action is the FCAP. The effect of these differences is that the proposed interim action will significantly exceed the applicable requirements of the FCAP. The differences are described in the following subsections.

1.2.1 Residential Properties Adjacent to the Fenced Area

If Asarco decides to proceed with remediation of the residential properties adjacent to the fenced area and within the boundary of property currently or historically owned by Asarco, the work will be conducted as per the FCAP; however, the performance monitoring program will be modified. The performance monitoring program contained in the FCAP was designed to evaluate whether soil arsenic concentrations meet the cleanup level, remediation levels, and other performance standards for each property before soil removal. While this program applies to these properties, existing data suggest that soil removal will be required to a depth of at least 1.5 to 2 feet. Because of the proximity of these properties to the fenced area, the remediation approach has been simplified to require at least two feet of soil removal from the residential properties before soil samples are collected. This strategy provides the following advantages:

- Ensuring that each of the selected properties will have at least two feet of clean backfill that meet the soil cleanup level of 20 mg/Kg for arsenic.
- Eliminating the need for one or two pre-removal sampling events with a drill rig. This strategy will be more cost effective and reduces the inconvenience to the homeowner. Samples will be collected with a hand auger after soil removal. Additionally, discrete samples will be collected at the same time as composite samples (see Appendix A).

1.2.2 Fenced Area

The FCAP selected the Consolidation Facility (accepting problem waste) alternative over the On-Site Containment Facility (accepting dangerous waste) alternative for the fenced area. Asarco's plan under this interim action will not provide a Consolidation Facility but will, following material removal and backfilling of the site, allow the fenced area to be re-developed consistent with the land use rules of the City of Everett.

The interim action should, upon completion, constitute the final cleanup for the fenced area. Asarco's preferred remediation approach for this site is source control: removal and on-site control of material that has the potential to be directly exposed to people and the environment or that can contribute arsenic and other metals to groundwater, surface water, and storm drain sediments. Removal of soil and smelter debris with concentrations over 150 mg/Kg arsenic, followed by capping/containment with at least two feet of clean material, will eliminate direct exposure and is expected to reduce concentrations in groundwater, surface water and storm drain sediments to levels below the cleanup levels listed in Section 1.1. Post remediation monitoring will document the extent of the reductions achieved in these media; should the cleanup levels be attained there is no reason why the interim action will not satisfy the WAC requirements for final cleanup of the fenced area.

The key differences for remediation of the fenced area from the provisions of the FCAP are discussed below.

Soil Removal

In accordance with the FCAP, material that is in excess of 3,000 mg/Kg arsenic will first be removed. However, it will not be sent off for disposal at a permitted commercial facility. Instead, it will be transported to the former Tacoma smelter. This material will subsequently be processed (i.e., reduced in size) if needed, and placed in the Tacoma OCF.

Soil with arsenic concentrations greater than 150 mg/Kg will also be removed and transported to the former Tacoma smelter rather than being placed in a Containment Facility constructed at Everett. This soil will be treated in the same manner as the Ruston/North Tacoma residential soils and will be subsequently used as subgrade backfill below the Tacoma smelter site-wide cap.

Soil Sampling

With the elimination of the Consolidation Facility, the FCAP's performance monitoring strategy has to be adjusted. Sampling will be similar to the residential property strategy. Grids or decision units will be established after the targeted soil is removed. Three sampling events, or phases, will be conducted. One phase will verify the removal of material containing an excess of 3,000 mg/Kg arsenic and the second will verify the removal of soil containing an excess of 150 mg/Kg arsenic. The third phase will provide data following site grading before clean import material is placed. The soil sample collection frequency will follow the FCAP guidelines (i.e., number of locations per square feet). The third phase was requested by Ecology specific to this IAR and these provisions are not mentioned in the FCAP. Specific revisions are presented in Appendix A.

Other

With the elimination of the Consolidation Facility, granite monuments called for in the FCAP will not be erected. In addition, the need for constructing a groundwater interception and diversion trench upgradient of the fenced area is eliminated as only material less than 150 mg/Kg arsenic will be left on-site. Deed restrictions will provide for an easement in which such a trench can be constructed, if needed. The easement will be in place until monitoring data have indicated the source removal is successful.

1.3 INTERIM ACTION TIMING

WAC 173-340-430 (4) specifies the requirements for timing of an interim action in context of the overall cleanup anticipated for a site. It also requires Ecology to set deadlines for the interim action commensurate with the activities to be performed. As stated in the enforcement order, removal of materials with arsenic concentrations above 3,000 mg/Kg is required to begin no later than April 30, 2003 and be completed by October 30, 2004. Deadlines for reports have been established by Ecology.

The timing of the work at Everett under this IAR needs to be closely coordinated with the remediation activities at the Tacoma smelter, particularly the excavation of the remaining source area materials and placement to this and other stockpiled source area materials in the OCF. This is explained in more detail in Section 3.1.2; the overall plan as presented in this IAR is intended to occur within the above-mentioned timeframes established by Ecology.

There are several actions that need to take place in order for the work at Everett to proceed on a schedule that can meet Ecology's timeline. These were included in Asarco's August 9, 2002 letter to Ecology regarding the actions anticipated per the enforcement order. Table 1-6 provides an updated timeline for the actions needed to meet Ecology's deadlines.

1.4 SUBMITTAL REQUIREMENTS FOR THE INTERIM ACTION REPORT

Submittal requirements for the interim action are specified in WAC-340-430 (7). This IAR addresses these requirements as shown in Table 1-7.

TABLE 1-6 REGULATORY AND STAKEHOLDER APPROVALS

Start Date(s)	Anticipated Completion Date	Task	Status
July 25, 2002	August 9, 2002	Prepare IAR Outline.	Complete
August 10, 2002	August 23, 2002	Agency IAR Outline review & approval.	Complete
August 23, 2002	January 31, 2003	Work with EPA and Ecology to obtain all necessary approvals; consult with Stakeholders	In process
August 23, 2002	November 8, 2002	Prepare Draft IAR.	Submitted November 8, 2002
August 2002	Undetermined	EPA negotiations on 2003 work scope.	In process
November 12, 2002	December 16, 2003	Agency Draft IAR review and comment.	Completed.
November 12, 2002	December 20, 2002	Prepare Public Review Draft IAR	Completed
December 20, 2002	January 31, 2003	Prepare plans and specifications and Final IAR.	To be completed.
February 1, 2003	February 28, 2003	Ecology Review & Approval – Final IAR and plans and specifications.	To be completed
September 1, 2002	February 15, 2003	All Agency approvals obtained to dispose of soils at Tacoma.	To be completed
March 1, 2003	April 30, 2003	Let Bids and Procure Contractor.	To be completed

TABLE 1-7 EVERETT SMELTER IAR SUBMITTAL REQUIREMENTS

WAC Citation	Requirement	Where Addressed in IAR
173-340-430 (7)(a)	A description of the interim action and how it will meet the criteria in subsections of (1), (2), and (3).	Sections 1.0, 1.1, and 1.2 respectively.
173-340-430 (7)(b)	Information from the applicable subsections of the RI/FS, including at a minimum: (i) A description of all available data related to the interim action; and (ii) Alternative interim actions considered.	(i) Addressed in Sections 2.0 and 2.1, Appendix E, and Exhibits 2-1 through 2-5. (ii) Addressed in Section 2.2.
173-340-430 (7)(c)	Information from the applicable subsections of the design and construction requirements of WAC 173-340-400.	Sections 3 and 4, Appendix D
173-340-430 (7)(d)	A compliance monitoring plan meeting the applicable requirements of WAC 173-340-410.	Appendix A
173-340-430 (7)(e)	A safety and health plan meeting the requirements of WAC 173-340-810.	Appendix B
173-340-430 (7)(f)	A sampling and analysis plan meeting the requirements of WAC 173-340-820.	Appendix C

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS

The Everett smelter site is located in northeast Everett, Washington and includes the former operation area of the Everett Smelter and the surrounding area. The smelter operated from 1894 to 1912 and the structures were demolished by 1915. Remnants of foundations, footings, flue and demolition debris from the smelter were still present when portions of the smelter area were redeveloped for residential use in the 1930s and 1940s. During this redevelopment, smelter demolition debris appears to have been graded with some localized cut and fill for construction of roads, basements, and walkways. The floors and foundations of the former smelter structures are still present in many areas in near surface soils. Construction of the road interchange of East Marine View Drive and State Route 529 in the northern portion of the former smelter operational area occurred in 1956. In the road interchange area, soils (including any residual smelter demolition debris) were excavated and used for fill under the adjacent State Route 529 overpass and Weyerhaeuser access road (see Figure 1-1).

The site has been divided into two primary areas: (1) the upland area, which includes the residential area west of East Marine View Drive; and (2) the lowland area, which includes the industrial properties at the base of the bluff east of East Marine View Drive, extending across the Weyerhaeuser East Site to the Snohomish River. The upland area has been further divided into two primary sub-areas: (1) the smelter area, which includes footprints of the former smelter operations area and adjacent areas where residual smelter materials and debris are present; and (2) the surrounding peripheral area. A portion of the smelter area has been purchased by Asarco and fenced off. The residential structures in this portion (the fenced area) have been demolished and only foundations and ground-level structures remain.

2.1 EXISTING SITE CONDITIONS

This section describes the existing site conditions in the area that will be addressed by the interim action; the fenced area and potentially the residential properties near to it within the boundary of the property historically or currently owned by Asarco (see Figure 1-2).

Environmental conditions in the former smelter area have been investigated and an evaluation of remedial options has been performed as documented in the Remedial Investigation (RI) and Feasibility Study (FS) report (Asarco, 1995). The requirements for additional characterization were specified in Enforcement Order DE 97TC-N119 issued by Ecology. As a result of this order, Asarco prepared the Smelter Area Investigation Report in August 1998.

2.1.1 Smelter Area Characterization Summary

The area of former smelter operations has been thoroughly investigated. For example, during the smelter area investigation, soil samples were collected at 60 locations to depths up to 39 feet. These samples were analyzed for total arsenic and lead and selected samples were also tested for leachability and toxicity. Sampling locations were identified based on a variety of information sources, including: (1) historical maps of the smelter which showed locations of operations units; (2) documentary information on the nature of the different materials handled and processed by the smelter in each area; (3) documentary information on smelter demolition and subsequent development (including residential and right-of-way); (4) a series of aerial photographs beginning in 1941 showing development activities; and (5) data from previous soil, groundwater, and surface water investigations.

The smelter area investigation provided further characterization regarding the nature and extent of elevated concentrations of arsenic and lead associated with the residual materials from the smelter demolition and subsequent redevelopment of the property (see Smelter Area Investigation Report). From a practical perspective an overarching goal of the investigation was to characterize the location of smelter residuals with respect to the fenced area and immediately surrounding areas. Identification of the nature and extent of these residuals was important from the perspective of evaluating potential waste categories and also in the evaluation of sources of arsenic to groundwater and surface water. Information was gathered regarding the residual contamination associated with the historical smelter footprint. Additional data has also been collected to determine if residuals are present outside of the historical footprint due to redevelopment, which occurred after the smelter closed. Samples were collected from within the currently fenced portion of the historical smelter footprint,

portions of the historical smelter footprint outside of the fenced area, and from outside the perimeter of the historical smelter footprint. The investigation was implemented to gather as much pertinent information as possible; however, this section summarizes the information relevant to this IAR (i.e., the fenced area).

The information collected and data generated through the smelter area investigation was combined with all pertinent data from previous investigation to identify the nature and extent (volumes) of potential state extremely hazardous waste (EHW), federally designated hazardous waste, and state dangerous waste (DW). Based on the analysis in the Smelter Area Investigation Report, materials containing greater than 760,000 mg/Kg arsenic would be classified as EHW using the book designation procedure in the WAC, although it was noted that bioassay testing of materials with arsenic concentrations between 10,000 and 760,000 mg/Kg may result in a lower threshold value for EHW. No level was established for State DW, however, it would be greater than 10,000 mg/Kg arsenic, based on the results of the bioassay testing.

No additional TCLP testing was performed during the smelter area investigation. Previous evaluations estimated that total arsenic concentrations of 3,000 mg/Kg would exceed the TCLP standard of 5 mg/L at the upper 95% confidence limit. This level would represent federally designated hazardous waste.

Based on these evaluations in the Smelter Area Investigation Report, the aerial extent and depths of materials that, if excavated, would fall under the different waste categories was estimated. The findings were as follows:

- No EHW has been identified at the site.
- Materials that may be classified as State DW (greater than 10,000 mg/Kg arsenic) were contained within the fenced area, with the exception of a relatively small volume of material just outside the fenced on the eastern boundary next to East

Marine View Drive. No potential State DW was identified in any current residential property. The materials were primarily associated with residual flue dust and arsenic in smelter debris within and immediately adjacent to the footprints of former smelter flues, dust chambers and arsenic processing units. The materials are present over an approximate area of 1.4 acres (this is the area for materials with 10,000 mg/Kg or greater arsenic) at depths ranging from 1 to 10 feet. The aerial extent of this material is shown on Figure 2-1. The total volume of materials with arsenic concentrations greater than 10,000 mg/Kg was estimated to be approximately 10,000 to 15,000 cubic yards, with just 1,000 cubic yards present outside the fenced area in the East Marine View Drive right-of-way.

- The majority of materials which would be designated as federal hazardous waste if excavated were also contained in the fenced area with the exception of an area just outside the eastern fence along East Marine View Drive. The materials were associated with the same residuals discussed for State DW but with slightly greater areas of smelter debris and with soils underlying smelter materials in some areas. It was noted that occasional single values of arsenic concentrations have been measured above 3,000 mg/Kg at other areas at the site (Medora Way, for example). However, these appear to represent small pockets of materials which could not be excavated discretely and would therefore most likely not be classified as hazardous waste after excavation with the immediately adjacent material. Based on this analysis, the materials in the fenced area that are expected to have arsenic concentrations greater than 3,000 mg/Kg are present over an area of approximately 2.8 acres at depths ranging from 1 to 10 feet. The estimated aerial extent of these materials is shown on Figure 2-2. The total volume of materials with arsenic concentrations greater than 3,000 mg/Kg was estimated to be approximately 20,000 to 25,000 cubic yards, with just 600 cubic yards present outside the fenced area in the adjacent East Marine View Drive right-of-way.

The principle findings of the smelter area investigation with respect to smelter material residuals in the fenced area were:

- Test pits identified intact floors and foundations of former smelter structures at between one to four feet below current ground surface at several locations. In addition, an intact underground flue was identified in the northern portion of the fenced area. These observations corroborated within a few feet the location of the former smelter structures which was estimated based on historical smelter maps. Debris from smelter demolition is present above the intact floors within the footprints of former smelter structures and in immediately adjacent areas.
- The investigation confirmed that the smelter materials of primary interest are residual arsenic trioxide and flue dust. Arsenic trioxide was a product of the smelting process, containing approximately 760,000 mg/Kg arsenic. Flue dust was a byproduct of smelting and roasting operations, containing approximately 25,000 mg/Kg arsenic.
- Residual arsenic trioxide and flue dust is present, usually mixed with demolition debris, within and adjacent to the footprints of structures where it was handled, processed or stored during smelter operation. The highest arsenic concentrations measured were in smelter material containing residual arsenic trioxide. Transport of arsenic from residual smelter materials to underlying soils has occurred at some locations indicating that these materials have potential to be sources of arsenic to groundwater. In most cases the arsenic concentrations attenuated rapidly with depth.
- Soil borings drilled around the southern boundary of the fenced area did not find smelter residuals outside the fence between Hawthorne Street and East Marine View Drive.
- Soil borings drilled inside and outside the fence along the western boundary of the fenced area indicate that smelter residuals are not present outside the fence along Hawthorne Street.

Synthetic Precipitation Leachate Procedure (SPLP) testing demonstrated that smelter materials containing residual arsenic trioxide or flue dust can act as sources of arsenic under ambient leaching conditions. These smelter materials are identified as the principal potential sources of arsenic to groundwater in the smelter area, although other localized factors are likely to be important such as materials volume and infiltration rates. The estimated aerial extent of smelter residuals containing arsenic trioxide or flue dust is shown on Figure 2-3.

Limited testing of surface soils was performed to evaluate potential sources of arsenic to surface water. Sources appear to be associated with smelter residual materials in the fenced area. The findings on the nature and extent of materials that may be acting as sources of arsenic to storm water are presented in the Storm Water and Storm Drain Sediment Characterization Controls Work Plan (Asarco, 1998).

In summary, the smelter area investigation filled data gaps from previous investigations to further refine the nature and extent (volume) of smelter residuals within and adjacent to the former smelter footprint. The data were used to evaluate the nature and extent of materials, which if excavated, may be classified as extremely hazardous waste, federally designated hazardous waste and state dangerous waste. The smelter residuals are also the principal potential sources of arsenic to groundwater and surface water.

2.1.2 Site Conditions Related to Interim Action Plans

The existing site conditions as they relate to the tasks planned under this interim action are graphically described in Exhibits 2-1 through 2-5. The CD provided to Ecology contains photographs taken from various locations in the fenced area and generally illustrates the current surface condition, including vegetation, which is more difficult to convey in the exhibits. Exhibits 2-1, 2-2, and 2-3 depict the existing surface topography, underground utilities, and overhead utility network, respectively, in and around the fenced area. Exhibits 2-4 and 2-5 present subsurface cross-sections across the fenced area and include related boring/soil sample results (see also Appendix E for the complete list of soil sample results and the associated geologic logs).

The interim action is primarily a removal action; soil and smelter debris with arsenic concentrations greater than 3,000 mg/Kg will be removed first followed by removal of underlying or adjacent soil with arsenic concentrations greater than 150 mg/Kg. The data collected to date provides sufficient information to plan the excavation and removal of this material and no further pre-removal sampling is planned. The basis for this design approach, including performance sampling after excavation, is discussed in Section 3. The site conditions that support this design approach are summarized below (see Exhibits 2-4 and 2-5):

- (a) The previous smelter area investigation documented these conditions related to material greater than 3,000 mg/Kg arsenic:
 - They are primarily associated with debris and residual flue dust in smelter debris within and immediately adjacent to the footprints of former smelter flues, dust chambers and arsenic processing units.
 - These materials are present over a well-defined area of approximately 2.8 acres and at depths ranging from 1 to 10 feet.
 - Observations of former smelter structures were confirmed to within a few feet of the expected location based on historical smelter maps.
 - Debris from smelter demolition is present above the intact floors within the footprints of former smelter structures and in immediately adjacent areas.
- (b) Previous soil samples, from borings, wells, and test pits, show that arsenic concentrations decrease significantly with depth, particularly with depth into the glacial till. While there is some variability with depth closer to the existing ground surface, this can be addressed by increasing the excavation depth to levels shown to be, or highly likely to be, less than 150 mg/Kg arsenic.
- (c) The stratigraphy of the fenced area is consistent, which minimizes the potential for vertical or lateral migration of arsenic into the glacial till beyond the estimated limit of 3,000 mg/Kg arsenic. In addition, once concentrations in the glacial till are less than 150 mg/Kg arsenic, there is little likelihood that material at greater depth will exceed this value.

- (d) The physical nature of smelter debris and residuals is visually distinct, which will allow excavation to “chase” this type of material if it is encountered beyond the estimated 3,000 mg/Kg arsenic boundary.

The other primary consideration regarding site conditions is the need to excavate and transport off-site upwards of 60,000 cubic yards of material and import about 15,000 – 20,000 cubic yards of clean backfill. The site is relatively small and the only method available to move material on and off-site is by truck. Truck access is limited to East Marine View Drive, Hawthorne St., Pilchuck Path via Butler St., and 5th St.

2.2 ALTERNATIVE INTERIM ACTIONS CONSIDERED

The proposed approach to conduct the interim action is very specific and requires the work at the Everett smelter to be closely coordinated with the remediation underway at the former Tacoma smelter. Consistent with Ecology’s direction, no other alternatives have been considered to conduct the interim action.

In a September 23, 2002 letter to Ecology, Asarco stated its position regarding the need for a contingency plan for off-site disposal in the event that approval to accept Everett material at the former Tacoma smelter cannot be obtained in a timely manner. If this occurs, Ecology has stated that it expects the Everett material to be shipped to a commercial disposal facility permitted to accept the material from Everett. In this letter, Asarco stated, in part, that the company has not committed in any way to ship the Everett smelter material to a commercial facility in the event that timely approval to accept this material at the Tacoma smelter is not obtained.

With the respective positions of Ecology and Asarco clearly understood, the company stated that a contingency plan would be presented in this IAR addressing disposal of Everett material at another facility if the Tacoma smelter is unavailable. The plans for this are described below.

2.2.1 Contingency Plan for Material Above 3,000 mg/Kg Arsenic

There are two potential actions that may be implemented if the material with arsenic concentrations greater than 3,000 mg/Kg are not accepted for disposal in the Tacoma smelter OCF:

- (a) If at all possible under the permits for the commercial disposal facility (Subtitle C), the material will be transported for landfill disposal without further treatment upon receipt (direct placement). Treatment costs may range between \$50 - \$80/ton; however, treatment does not provide any meaningful improvement in the characteristic of this material (see Tacoma Smelter ROD). Ecology would be requested to support direct placement at the receiving facility. If Asarco requests such support, the request will include the basis on which Asarco believes Ecology could base such support. Ecology has agreed to consider supporting placement without treatment, but has not committed to do so.

- (b) If treatment is required, the option for treating the material on-site before transportation to the disposal facility will be evaluated and, if more cost effective, implemented. It is expected that treatment will consist of the addition of pozzolanic agents (e.g., cement, kiln dust, fly ash) with limited amounts of water to stabilize the soil and smelter debris. The material handling and unit operations for on-site work would need to be adjusted accordingly. Ecology would be requested to support this approach if it will meet the receiving facility's requirements more cost effectively. If Asarco requests such support, the request will include the basis on which Asarco believes Ecology could base such support. Ecology has agreed to consider on-site treatment, but has not committed to do so. Ecology will pay particular attention to public concerns associated with such a request.

- (c) Removal of source material is planned to take place over two years to comply with Ecology's requirement that work begin by April 30, 2003. However, EPA has stated that it's conditions for allowing source material to be transported to or disposed of in the Tacoma OCF, in part, requires completion of the excavation of source materials at

Tacoma and placement in the OCF before Everett material is received. This will not

be completed until mid-2004. If this condition remains, the source material removal from Everett would need to be deferred until 2004, at which time source material would be excavated from both the Upper and Lower areas and shipped to Tacoma for placement in the OCF. This activity would be completed by the end of October 2004 as the Enforcement Order requires. Residential material removal in this scenario is discussed in 2.2.2 (c) below.

Delay of removal of Everett source material to 2004 will not meet the required date for beginning removal of this material in Enforcement Order #02TCPNR-4059, and hence would be a violation of the Order. In the event Asarco and EPA have reached agreement for acceptance of this material beginning in 2004, the Order could be amended to provide for beginning removal in 2004 rather than 2003. Ecology has advised Asarco that they will consider such amendment, but only after careful consideration of Asarco's agreement with EPA, the degree of surety removal will start in 2004, and public comment on any proposed amendment.

If EPA determines that some Everett source material can be received at Tacoma during 2003, the Upper area would be excavated as described in this IAR and transported to Tacoma where it would be stored in the Fine Ore Bins building until placement in the OCF in 2004. The remainder of the source material would be removed in 2004 as currently scheduled. If this occurs, the source area excavations in the Upper area would be handled in one of two ways:

- The residential material below the source material would be excavated and transported to Tacoma where it would be stockpiled with other residential soils from Tacoma and Ruston. This material will eventually be graded and placed below the site-wide cap as planned. The excavation limits would be marked with filter fabric, the excavation backfilled with clean import material to approximately the original grade, and the disturbed areas hydroseeded for temporary erosion control.
- The second option is similar to the first except that removal of residential material from the Upper source areas would be deferred for a year. The source area

excavation would be minimally re-graded to accept a temporary PVC liner that would be installed to prevent surface water contact with the disturbed area during the winter shutdown period. Surface water berms/ditches would be constructed to divert runoff from surrounding areas reporting to the lined excavation. The excavated area would collect water that results from direct precipitation only; the liner will prevent any contact with disturbed soils so this collected water should be able to be pumped periodically to the City of Everett storm water system. If, for any reason, Asarco does not proceed with excavation of residential material in the construction season following placement of the PVC liner, Asarco will remove the liner and recontour and revegetate the area in a manner acceptable to Ecology and the City of Everett.

- (d) Removal of material with arsenic concentrations above 3,000 mg/Kg may still use the former Tacoma smelter for intermediate storage before ultimate transport to disposal. EPA would have to approve this intermediate storage contingency. This option would be most appropriate for the material removed during Stage 1, which is estimated to be about 4,700 cubic yards (see Section 3.1). Material would be transported to the former Tacoma smelter and stored in the Fine Ore Bins until it is shipped to the final disposal facility. This approach would allow Asarco to defer the significant disposal cost for about a year while still proceeding with the removal action at Everett during the first year. Again, Ecology would be requested to support this action, which would also require approval by EPA. If Asarco requests such support, the request will include the basis on which Asarco believes Ecology could base such support. Ecology has agreed to consider such intermediate storage at the Tacoma Smelter, but has not committed to do so.

2.2.2 Contingency Plan for Material Less Than 3,000 mg/Kg Arsenic

If the former Tacoma smelter cannot accept material with arsenic concentrations between 150–3,000 mg/Kg, there are two potential contingency actions:

- (a) Excavation and disposal at a Subtitle D facility. This is the approach Ecology is using to dispose of soil from residential cleanups that it conducts.

(b) Suspend removal and disposal of this material until funding associated with site redevelopment becomes available. The current enforcement order addresses only material greater than 3,000 mg/Kg arsenic. If the former Tacoma smelter is not able to accept material below this limit, the soil would be left in place after grading for drainage, minimal backfill/cover, and hydroseeding. If and when Asarco is able to secure financing via a developer or some other entity for redevelopment of the site, the remaining material would be removed and disposed of off-site per (a) above. This is the preferred option if the former Tacoma smelter cannot accept this type of material.

(c) Residential soil removal alternatives associated with the source removal contingencies in 2.2.1 (c) above are described in this paragraph. If EPA determines that some Everett source material can be received at Tacoma during 2003, the Upper area would be excavated as described in this IAR and transported to Tacoma where it would be stored in the Fine Ore Bins building until placement in the OCF in 2004. If this occurs, the residential soil underlying the source area excavations in the Upper area would be handled in one of two ways:

- The residential material below the source material would be excavated and transported to Tacoma where it would be stockpiled with other residential soils from Tacoma and Ruston. This material will eventually be graded and placed below the site-wide cap as planned. The amount of residential material removed is estimated at about 5,600 CY in the Upper source areas. The excavation limits would be marked with filter fabric, the excavation backfilled with clean import material to approximately the original grade, and the disturbed areas hydroseeded for temporary erosion control. Removal of the remaining residential material from the Upper area would follow in the subsequent year.
- The second option is similar to the first except that removal of residential material from the Upper source areas would be deferred for a year. Residential material in the source area excavations will be isolated from surface water by minimal re-grading to accept a temporary PVC liner installed to prevent surface water contact with the disturbed area during the winter shutdown period. Surface water

berms/ditches would be constructed to divert runoff from surrounding areas reporting to the lined excavation. The excavated area would collect water that results from direct precipitation only; the liner will prevent any contact with disturbed soils so this collected water should be able to be pumped periodically to the City of Everett storm water system. If, for any reason, Asarco does not proceed with excavation of residential material in the construction season following placement of the PVC liner, Asarco will remove the liner and recontour and revegetate the area in a manner acceptable to Ecology and the City of Everett.

3.0 SITE CLEANUP DESIGN REQUIREMENTS

This section consists primarily of the requirements of WAC 173-340-400 (4) applicable to the fenced area, namely these subsections:

- (a) The Engineering Design Report (Sections 3.1 through 3.4 below);
- (b) List of Construction Plans and Specifications (Appendix D); construction documents will be prepared as a separate deliverable following Ecology's approval of this IAR; and
- (c) Operations and Maintenance Plan (to be included as part of Appendix D).

The other provisions of WAC 173-340-400, subsections (5) through (9), applicable to the fenced area are addressed in Section 4 of this IAR. The option of remediating the residential properties within the former smelter footprint immediately adjacent to the fenced area is included per the provisions of the Everett FCAP (see Section 3.5). Should this option be implemented, plans and specifications for individual properties will be substantively similar to the bid documents Ecology prepared for residential cleanups at Everett.

3.1 SOIL AND DEBRIS EXCAVATION, REMOVAL, AND REPLACEMENT

This section describes the conceptual design soil removal and replacement within the fenced area. General plans illustrating the sequence and methodology for this activity are included in addition to the rationale for conducting the work as described. The conceptual design also includes options that may be implemented during different stages of soil and debris excavation and removal.

The following subsections of WAC 173-340-400 (4)(a) are addressed in this subsection:

- (i) Goals of the cleanup action
- (ii) General facility information – see also Section 2.1 above
- (iii) Identification of who will own, operate, and maintain the cleanup
- (iv) Facility Maps showing how the cleanup will be conducted

- (v) Characteristics, quantities, and location of materials to be managed, including groundwater
- (vi) Schedule and options for final design and construction
- (vii) Description and conceptual plans of the excavation, removal, and replacement tasks

3.1.1 Cleanup Goals and Summary of Cleanup Responsibilities

There are two cleanup goals for the cleanup of the fenced area:

- Remove the soil and debris greater than 3,000 mg/kg As with ultimate disposal of this material in the OCF at the former Tacoma smelter.
- Remove the remaining soil greater than 150 mg/kg As and dispose of it at the former Tacoma smelter, where it will be used as subgrade backfill and placed underneath the site-wide cap. Following removal of this material, a marker barrier similar to that used in the residential areas will be placed and the fenced area will be backfilled with at least two feet of soil with arsenic concentrations less than 20 mg/kg.

At the completion of the remediation, the requirements of the FCAP for cleanup to residential standards will be satisfied in the fenced area (e.g., no material greater than 150 mg/kg arsenic will be within two feet of the final revegetated surface). This will allow subsequent redevelopment of the property by Asarco or others within the range of land uses allowed by the City of Everett, including residential development.

Asarco expects that it will be the entity that conducts the cleanup of the fenced area, probably through use of its own personnel and independent contractors, both at Everett and at Tacoma. Asarco has not selected a construction contractor for Everett at this time; however, engineering design and oversight will be performed by Asarco Consulting, Inc. Most of the laboratory analyses will be performed on-site, at Asarco Consulting's XRF lab in Tacoma, or samples will be sent to Asarco's TSC Laboratory in Salt Lake City. Some

analyses such as soil fertility and soil organic content tests will be performed by local commercial laboratories.

Asarco owns the non-public property in the fenced area, several individual properties surrounding the fenced area (see Figure 1-2), as well as the former Tacoma smelter property. Streets and an alley are the only other public property in the fenced area and are owned by the City of Everett. Access to and removal of the streets, overhead electrical distribution lines, and other underground utilities will be needed to complete remediation of the fenced area. Depending on the method of transportation, Asarco may also use barge loading facilities in Everett owned by others. Access and related provisions for other privately owned facilities and public areas needed to conduct the cleanup are discussed further in Section 3.4.

3.1.2 Fenced Area Layout and Designations for Cleanup

The fenced area and surrounding area has been previously described in this document and in other investigations (see Section 2.1). For design and construction purposes, the fenced area has been designated at a finer level of detail based on the anticipated excavation methodology:

- The fenced area is subdivided into two sub-areas: an Upper (U) area and Lower (L) area (see Figures 3-1 a - c and 3-2 a - f; note these figures also include Tables 3-1 and 3-2). The Upper area is bounded on the east by Pilchuck Path and the west by Hawthorne Dr. The Lower area extends from Pilchuck Path east to East Marine View Dr. and includes 5th St. and the alley east of Pilchuck Path.
- Sub-areas are further designated by the primary type of material that will be removed from it: Source (S) material designates areas likely to have concentrations > 3,000 mg/kg As, and Residential (R) soils that will probably have concentrations <3,000 but > 150 mg/kg As. The Source and Residential designations are the same used to describe similar material at the former Tacoma smelter and will facilitate the correct handling of the material upon receipt there.

- Sub-areas are numbered sequentially based on the previous two designations. In the Upper area, sub-areas are designated US-1 through US-12 and UR-1 through UR-24. The Lower area designations are LS-1 through LS-84 and LR-1 through LR-11.

In general, the Upper area consists mainly of R material with well defined areas of S material near the southern portion of the Upper area and west of the north end of Pilchuck Path. In contrast, the Lower area consists primarily of S materials that are underlain by R materials. The estimated quantities for the sub-areas are shown in Table 3-3. No allowance for shrink/swell are reflected in these quantities.

TABLE 3-3. SUMMARY OF ESTIMATED QUANTITIES

<i>Area and Type of Material</i>	<i>Estimated Quantity (CY)</i>
Upper Source	4,660
Upper Residential	11,900
Subtotal Upper	16,560
Lower Source	19,800
Lower Residential	24,560
Subtotal Lower	44,360
Subtotal Source	24,460
Subtotal Residential	36,460
Total Source and Residential	60,920

3.1.3 General Plan of Material Excavation and Replacement

This difference in the distribution of the S and R materials between the U and L areas necessitates two separate excavation and removal approaches. The Upper area will be excavated the first year (i.e., Stage 1) and the Lower area will be remediated in the second

year (Stage 2). In both stages, removal of S material occurs before R soils. Remediation of the Upper area will resemble the cleanups of residential properties near the fenced area. Excavation depths to remove R materials will be relatively shallow except in the smaller US areas, where removal of S materials will precede excavation of R materials. In the Lower area, the amount of S material is substantially more than in the Upper area. In addition, the cross-contamination potential between S and R areas is much higher due to the greater aerial extent of S material, the deeper excavation depths required, and the surface water drainage paths across the Lower area. As such, smaller sub-areas that can be more easily controlled as they are excavated are needed.

The other key aspects in the approaches for the Upper and Lower areas are described below:

- Stage 1 is planned for late April to mid-October the first year. Material removal would occur in the drier months of July, August, and September followed by re-grading, backfilling, re-grading, and revegetation. Stage 2 would start in early April of the second year and would be completed later that year (currently scheduled for October 31, 2004), again including re-grading, backfilling, re-grading and revegetation. Removal of S material in Stage 2 is planned for May and June with R material following in July and August. Construction of replacement roads and utilities through the fenced area are not planned as part of remediation but would be completed as part of future redevelopment.
- Roads are left intact during Stage 1 and are removed during Stage 2 (Pilchuck Path, 5th St., and the alley east of Pilchuck Path).
- Only those utilities extending into US and UR subareas need to be disconnected and abandoned during Stage 1, although some rerouting of overhead electrical service along Pilchuck Path may be needed during this stage. During Stage 2, all utility services will need to be abandoned and removed to complete the cleanup. The degree to which they will be re-established will be determined in conjunction with the utility providers and the City of Everett.

- Use of existing material < 150 mg/kg on-site for backfill more than 2 feet below final grade is likely and will minimize the amount of backfill that needs to be imported. Clean material will need to be imported to achieve final grades; however, final grades will be lower following remediation. Should development occur after remediation, additional clean material can be imported by the developer to achieve the grades needed for development.
- Clearing, grubbing, and removal of foundations will occur in both stages. Surface soils with lawn or plant roots will be segregated for off-site disposal; material from R areas can go to Tacoma, material from S areas will need to go to another permitted Subtitle C landfill because this high-organic material cannot be placed in the Tacoma OCF. Trees and large shrubs will be taken to a permitted landfill for disposal (not recycling). Concrete can be taken to Tacoma where it will be crushed and placed according to the area it originates (i.e., from R areas can go below the site-wide cap, from S areas should go to the OCF). Alternatively, concrete and asphalt could go to approved recyclers with Ecology's authorization.
- Surface water controls will be needed during active construction in both stages; however, the type and extent of controls needed for the Upper area are significantly less than for the Lower area (see Section 3.2). Groundwater is not expected to be encountered in any substantial quantities and will be incorporated with the surface water controls as necessary.
- Material will be stockpiled and loaded to over-the-road trucks (nominal 30 tons capacity) and/or smaller 10 CY trucks for transfer to barge for transportation to the Tacoma smelter. The option of use of containers to load and ship contaminated soil may also be viable depending on costs and other logistical factors (e.g., equipment needed to load/unload barges).

These two approaches for excavation/stockpile/backfill tasks are sequentially described in Tables 3-1a through 3-1c and 3-2a through 3-2h for the Upper and Lower areas, respectively. Figures 3-1a through 3-1c and 3-2a through 3-2h illustrate the excavation sequence. Figure 3-3 shows the removal depths targeted for each area. Exhibits 3-1 and 3-2 show the surface contours anticipated after removal of the S and R material and the final grade following remediation for the Upper and Lower areas, respectively. Exhibit 3-3 presents cross sections showing the estimated depths to glacial till, the anticipated excavation depths after removal of the R material, and the final surface elevation after remediation. Material handling and transportation options are described in Section 3.3.

3.2 ENGINEERING DESIGN CRITERIA AND FEATURES

This section describes the engineering design criteria and parameters upon which the overall cleanup is based. The following subsections of WAC 173-340-400 (4)(a) are addressed in this section:

- (viii) Engineering justification for the design and operations parameters, including:
 - (A) Design criteria, assumptions, and calculations for components of the cleanup that have not already been designed.
 - (B) Containment effectiveness – (see also Record of Decision for the Tacoma Smelter, EPA, March 1995).
 - (C) Demonstration that cleanup will achieve compliance with cleanup criteria of FCAP.
- (ix) Design for control of spills or accidental releases.
- (x) Design features to assure long-term safety of workers and local residences.

3.2.1 ENGINEERING DESIGN EVALUATION

The plan described in this IAR is based on combining the removal actions in the fenced area at Everett with the ultimate disposal facilities Asarco has constructed at the former Tacoma smelter, which is being remediated under EPA oversight. At the Tacoma smelter, a much larger amount of the same type of material present at Everett (i.e., Source material) is being excavated and disposed of at the smelter in an OCF. The capacity of the OCF is 260,000 CY

and the current estimate of the quantity of material from the Tacoma smelter that will be disposed of in the OCF is about 210,000 CY. Under the terms of the ROD for the Tacoma smelter, EPA determined that the OCF must be constructed to exceed RCRA Subtitle C standards for hazardous waste landfills in order for the source area materials to be disposed there without further treatment.

The remaining capacity of the OCF at Tacoma is available to dispose of the same type of material from Everett within the fenced area. This volume has been estimated to be about 25,000 CY, less than 10% of the amount of material that will be disposed of from Tacoma and well within the remaining capacity of the OCF.

The key elements of the approach Asarco is prepared to implement for removal of the fenced area material at Everett are:

- The Source material greater than 3,000 mg/kg arsenic within the fenced area will be removed and transported to the Tacoma smelter for disposal in the OCF without treatment.
- Residential material greater than 150 mg/kg arsenic will also be removed from the fenced area, transported to Tacoma, and placed beneath the smelter site-wide cap along with other soils from the cleanup of residential yards in Ruston and north Tacoma.
- After removal of the material from the fenced area, this area will be remediated consistent with the soil cleanup requirements of FCAP. The site will be backfilled and graded with clean material following remediation. At that point, the property will be in a condition to support further redevelopment.

This overall concept greatly simplifies the type and extent of engineering design needed to perform the cleanup. The WAC requirements regarding ultimate disposal, particularly containment effectiveness, are met and documented in EPA's ROD for the Tacoma smelter

and the associated design documents submitted to EPA and Ecology during the design process at that site. The Source and Residential material from Everett will be handled in the same fashion as the comparable material at Tacoma. Consequently, no further documentation or analysis in this IAR is needed regarding the ultimate disposal of this material at the former Tacoma smelter.

Similarly, the FCAP for the Everett site addressed the issues regarding the cleanup and containment effectiveness for material up to 150 mg/kg As at a depth of 2 feet or more. As this will be the site condition following completion of the remediation of the fenced area, it does not need to be further evaluated. Finally, the FCAP specifies removal of material greater than 3,000 mg/kg from the fenced area, which is provided for in this IAR.

The remaining engineering design evaluations needed for this IAR are:

- Assessment of the removal methodology's ability to achieve cleanup goals;
- Evaluation of surface and groundwater control measures needed during and after the cleanup;
- Materials management issues; and
- Performance sampling to assure compliance with the cleanup standards.

The first two bulleted items are covered in Sections 3.2.2 and 3.2.3 below. The other two items are addressed in Sections 3.3 and 3.4, respectively.

3.2.2 Assessment of the Removal Methodology

The approach and methodology selected for the fenced area have been developed based on Asarco's experience at many other sites with a wide range of soil-metals concentrations. The Everett site, particularly the fenced area, has a few key features that provide a high degree of confidence that the removal methodology will achieve cleanup goals:

- ✓ The relatively shallow depth of surface soils/fill which are underlain by glacial till of significantly lower permeability. Previous sampling data shows that metals concentrations decrease rapidly with depth into undisturbed glacial till, limiting

excavation depth needed to achieve the 150 mg/kg As cleanup goal (see Appendix E). This information is sufficient to prepare excavation and removal plans without further field investigation.

- ✓ Groundwater flux across the fenced area is low (less than 1 gpm per 1,000 lineal feet – see Everett Smelter RI) and is mainly confined to the shallow surface fill strata. While some groundwater will be present, quantities are expected to be small and can be managed as part of the surface water control system. Significant groundwater dewatering is not anticipated.
- ✓ The highest concentrations identified in the fenced area are closely tied to smelter debris and residual by-products. These areas have been thoroughly mapped previously (see Everett Smelter Site Remedial Investigation, Hydrometrics, Inc. September 1995) and this information provides a clear guide to excavating the Source material. In addition, the debris and by-products are visually distinct from the native material, making it much easier and more reliable to excavate based on a visual as well as a chemical basis.
- ✓ The residential superstructures in the fenced area have been previously demolished and removed. All remaining foundations and soil below them will be removed as part of the cleanup. Also, the portions public roads that bisect the fenced area (Pilchuck Path, 5th St., and the alley east of Pilchuck Path), as well as underground utilities in these roadways and in the fenced area proper, will be removed to be able excavate Source and Residential soils in these areas. As such, the removal action will be total in this area; all remaining material will meet the concentration and depth requirements of the FCAP.

The excavation sequence and associated compliance sampling plans (see Appendices A and C) have been prepared to take advantage of these site characteristics. The key design elements incorporated into the excavation and removal plan discussed in Section 3.1 are summarized in Table 3-4.

3.2.3 Evaluation of Surface Water and Groundwater Controls

Surface water and groundwater controls will be implemented during the interim action. As previously discussed, groundwater flux across the fenced area is low and is mainly confined to the shallow surface fill. While some groundwater will be present, only small quantities are expected and will be managed as part of the surface water control system. Significant groundwater dewatering is not anticipated.

Surface water controls for remediation of the residential properties adjacent to the fenced area are specified in the FCAP and will be implemented when remediation of these properties occur. For the remediation of the fenced area, surface water controls will be implemented based on the City of Everett Stormwater Management Manual (*Stormwater Management Manual – City of Everett Public Works Department*, Rev. 4/00). For this site, the primary surface water issues are:

- ✓ Minimizing, to the extent practical, the contact of direct precipitation, run-off within the fenced area, and run-on from outside the fenced area from contacting disturbed or stockpiled soils; and
- ✓ Collecting surface water that has come in contact with disturbed soils and removing suspended sediment before discharge to the City of Everett stormwater system.

The surface water control measures are included in the Tables 3-1 and 3-2, and Figures 3-1 a - c and 3-2 a - f. The Everett Stormwater Management Manual provisions will be incorporated as part of the final design specifications along with specific provisions to be implemented (see also *City of Everett Design and Construction Standards and Specifications for Development*, Rev. 4/02). The surface water management design is consistent with the Stormwater Management Manual and incorporates both Best Management Practices (BMPs) and Erosion and Sediment Control (ESC) practices.

The excavation planned for Stage 1 (the Upper area) will be performed during July through September, which is the driest time of the year in Everett. While some rainfall can be expected, the storms are generally of short duration and low to medium intensity. The excavation sequence will allow any surface water that needs to be collected to be routed to the deepest areas excavated (e.g., US-1 through US-9) and contained prior to sediment removal and discharge.

Stage 2 (the Lower area) excavation will start earlier in the second year (May) and more intense storms of longer duration can be expected. As such, runoff collection, detention, and sediment removal will be needed before discharge. This will be accomplished by constructing a network of diversion dikes to route surface water to a detention pond or trap in LS-39 and LS-43. Assuming a worse case for the design storm, in which the entire Lower area runoff from a 10 year-24 hour event would need to be contained, results in required retention capacity of 0.375 acre-feet. This estimate also assumes no other BMPs within the Lower area. Providing that other BMPs will be installed, a sediment pond or trap 50 ft. x 50 ft. x 6 ft. would probably have sufficient capacity (about 0.35 acre-feet) to deal with the design storm. It is feasible to build a facility with sufficient capacity in this area; the actual configuration and design parameters will be included as part of the final design plans and specifications. These will be constructed at the outset of Stage 2 and will remain in service until this phase of the work is completed.

The other key aspects regarding surface water control for the fenced area are summarized below:

- ✓ General BMPs include, but are not limited to sediment detention ponds or traps, filter fabric fences, straw bale barriers, diversion dikes, inlet controls at catch basins, pipe slope drains, terracing, construction entrance rock pads, and hydroseeding.
- ✓ Intercepted groundwater (i.e., groundwater that “daylights”) will be routed to the surface water system and handled as surface water from the point of collection on.

- ✓ Excavation, fill, and backfill work areas shall be continually and effectively drained. In particular, water will not be permitted to accumulate in excavations that are receiving material that will be compacted.
- ✓ The contractor shall be required to construct suitable dikes, drainage ways, or provide portable pumping equipment to divert water flows away from work areas.
- ✓ Off-site water shall be routed around the site if possible; if it must flow across the site it will be prevented from contacting disturbed soils.
- ✓ Surface water originating from R areas will be prevented from contacting S soils insofar as is practical.
- ✓ Existing vegetative cover will remain in each sub-area until active excavation of that area begins.
- ✓ Stockpiles will be covered and BMPs implemented to divert surface water around the stockpile as well as to prevent migration of stockpiled material beyond the stockpile boundary.
- ✓ Periodic testing of surface water discharges will document the metals concentrations of surface water discharged from the fenced area during the interim action.

3.3 MATERIALS MANAGEMENT AND DISPOSAL

This section describes how material will be excavated, stockpiled, transported, and disposed of at the Tacoma smelter and how clean backfill will be placed and graded following remediation. The following subsections of WAC 173-340-400 (4)(a) are addressed in this section:

- (xi) Methods for management and disposal of any materials excavated and disposed of at the Tacoma smelter
- (xii) Facility specific characteristics that affect the movement and placement of materials at Everett and Tacoma, including;
 - (A) Relationship of the cleanup to the surrounding area
 - (B) Probability of flooding, seismic, and other local planning and/or development issues that could affect the cleanup
 - (C) Soil characteristics and groundwater system interactions with the cleanup

3.3.1 Unit Operations for Excavation, Removal, and Backfill

Section 3.1 describes the excavation, stockpile, and backfill sequence for the fenced area. This section describes the individual unit operations associated with these activities. Unit operations are the distinct steps associated with the excavation, stockpiling, transportation and disposal of material from the fenced area.

Figure 3-4 illustrates these unit operations for Source and Residential materials. Table 3-5 summarizes the key elements of each unit operation for both types of materials.

The on-site requirements for material management have previously been discussed. Off-site requirements will be governed by state and federal regulations covering hazardous materials. These requirements are well established for over-the-road transportation of S and R materials to the Tacoma smelter. There are several licensed transporters that can move the material to the Tacoma smelter and comply with all the applicable containment, spill response, and decontamination requirements. While feasible, over-the-road transport may pose

disadvantages in terms of higher cost, truck availability to support site work schedules, and traffic disruption, both at Everett and Tacoma.

The option of transporting fenced area soils to Tacoma via barge has been explored at a preliminary level. There are two potentially available barge loadout facilities in Everett close enough to be practical. Barging may be the most cost effective means to move material from Everett to the Tacoma smelter and could significantly reduce or eliminate traffic delays and impacts, both to the public and project-related at Everett. Tacoma has received material by barge, most recently the import of several hundred thousand tons of material needed to build the OCF berm. This option appears very feasible and should be further explored during final design.

There are also potential drawbacks to barging material, mainly the multiple transfer steps needed to eventually deliver the material to Tacoma. Control of any spillage, decontamination measures, and other steps needed to keep S and R material contained and secure from loading in Everett to its receipt at the Tacoma smelter will have to be developed. The use of shipping containers to move the material rather than in bulk may provide a practical means to address many of these issues. The provisions needed to employ barge transport are probably specific to each barge loadout facility and can be prepared as part of final design should this option continue to be viable.

3.3.2 Other Facility-Specific Characteristics

The FCAP and documents previously submitted to Ecology by Asarco (e.g., the Everett RI/FS) characterize the Everett site in detail and this information is not repeated in this IAR. The FCAP also addresses removal of S material from the fenced area. While the ultimate disposal site is different than the FCAP (i.e., the Tacoma smelter), the removal action is similar to that described in the FCAP. The FCAP did not contain provisions for removal of all the R material from the fenced area. Construction of a containment facility per the FCAP would mean that the R material would be excavated and stockpiled while the containment facility is built, followed by placement in the containment cell with other R material from the

surrounding areas. Excavation and off-site disposal of this material will be less of an impact than the plans envisioned by the FCAP.

The other facility specific characteristics that affect the movement and placement of materials at Everett and Tacoma are summarized below:

Relationship of the Cleanup to the Surrounding Area

The area surrounding the fenced area is primarily residential to the west and south with arterial streets bounding the site to the north and east. Access to the fenced area is limited to Hawthorne St., Pilchuck Path, 5th St., and East Marine View Dr. The sequence of remediation activities described in Section 3.1 takes this constraint into account. The main transportation routes during Stage 1 are via Hawthorne St., Pilchuck Path, and 5th St. The last two streets would be closed to the public during Stage 1 but reopened after the Upper area is complete. Pilchuck Path, the alley immediately to the east, and 5th St. will all be removed during Stage 2; primary site access will be via East Marine View Dr.

The most noticeable aspect of the remediation with the surrounding area is likely to be the amount of truck traffic to and from the site. Unfortunately, there is no other alternative to remove and deliver material at the site except to use trucks. A similar situation exists at the Tacoma smelter; the primary route for truck traffic between Everett and Tacoma is via Ruston Way. This two-lane arterial can pose significant delays on truck cycle times, especially during commuting hours or on fair weather days in the spring and summer. Barging the material to the Tacoma smelter would avoid this problem and could substantially minimize the impacts in Everett. A traffic management plan will be prepared to deal with the anticipated affects based on the transportation methods(s) selected as part of final design.

The provisions for public health and safety are addressed in the Health and Safety Plan in Appendix B.

Flooding, Seismic, and Other Local Planning and/or Development Issues

The potential for flooding and seismic issues affecting the cleanup at this site are minimal. The site is geologically stable, on relatively shallow slopes, and at the top of a hill that receives incidental run-on from surrounding areas. The surface water control plan is based on a 10 year-24 hour design storm as required by the City of Everett. Excavation and re-grading will occur during the drier months of the year, avoiding the major potential for storm events and run-off volumes in excess of the stormwater control capacity.

Redevelopment of the site is probable and desirable; however, the remediation design does not incorporate redevelopment features, particularly roads and utility services at this time. Should Asarco and a developer pursue redevelopment of the site, these features could be integrated into the final grading, a move that could be cost effective. Any redevelopment would follow the normal process for such activities governed by the City of Everett.

Soil Characteristics and Groundwater System Interactions with the Cleanup

As previously described in Section 3.2, there are no inherent soil characteristics or groundwater conditions that will materially interfere or hinder the cleanup. Excavation to depths of 15 ft. \pm into glacial till is expected to be difficult but surmountable with conventional equipment. Smelter debris will probably give rise to some surprises during the excavation; the design acknowledges this potential by keeping production rates reasonable and disturbed areas to a minimum.

3.4 REGULATORY COMPLIANCE

This section completes the requirements of the Engineering Design Report and addresses the following subsections of WAC 173-340-400 (4)(a)

- (xiii) General Description of construction quality control and testing to be performed
- (xiv) General Description of compliance monitoring to meet the requirements of WAC 173-340-410
- (xv) General Description of construction procedures to assure the safety and health requirements of WAC 173-340-810 are met
- (xvi) Not needed

- (xvii) Permitting requirements and access issues
- (xviii) Not needed
- (xix) Institutional controls per the FCAP (residential properties) and otherwise needed for the fenced area

3.4.1 Compliance Monitoring

The FCAP describes the procedures and protocols for these items in the residential areas adjacent to the fenced area. These procedures will be followed in large part when these properties are remediated; however, some differences are proposed and are described in Appendix A. The FCAP did not address removal R material from the fenced area. The compliance monitoring requirements for the fenced area are also addressed in Appendix A and are based on protocols in the FCAP to the extent practical (e.g. sample frequency).

Quality control (QC) provisions are included in the Compliance Monitoring Plan (Appendix A) and the Sampling and Analysis Plan (Appendix C). The Compliance Monitoring Plan is primarily aimed at chemical data obtained by sampling the excavated surface following removal. It also addresses chemical requirements and basic physical properties of imported material used as backfill as specified in the FCAP. The final design will include additional specifications for backfill material as well as the physical testing to be accomplished during backfilling and final grading. The specifications, including quality control requirements, will be based on the *City of Everett Design and Construction Standards and Specifications for Development*, Rev. 4/02. Additional quality control requirements applicable to backfill and grading activities may be included from ASTM or WSDOT protocols as needed.

The Health and Safety Plan (Appendix B) addresses monitoring for field personnel and for the general public. The primary exposure path for both workers and the general public will be via airborne emissions. As such, rigorous dust control provisions will be instituted to control emissions to levels below applicable standards. A general “no visible dust” standard will be imposed to assure that no visible dust is present at the fence line. Air sampling will be conducted for both field personnel (personal samples) and at the fence line to measure ambient concentrations.

3.4.2 Permitting Requirements

MTCA provides an exemption from the procedural requirements of the following state laws, though their substantive requirements must be met:

- RCW 70.94, Washington Clean Air Act
- RCW 70.95, Solid Waste Management Reduction and Recycling
- 70.105, Hazardous Waste management
- RCW 75.20, Construction Projects in State Waters
- RCW 90.48, Water Pollution Control, and
- RC 90.58, Shoreline Management Act of 1971

Ecology's FCAP incorporates the substantive requirements of applicable or relevant and appropriate requirements of the state laws listed above. (FCAP, Section 3.3). Because the proposed interim cleanup action is consistent with and meets or exceeds the requirements of the FCAP, the proposed interim action also complies with the substantive requirements of these laws and regulations.

Regarding local permits for construction activities entailed in the interim cleanup action, MTCA also provides an exemption from the procedural requirements of laws authorizing local government permits or approval for remedial actions. Again, the substantive requirements of local ordinances affecting land use, development and construction must be met.

The City of Everett has advised Ecology that substantive requirements for grading, storm water control, work in City rights-of-way, and other construction-related requirements will apply to the final cleanup and, by extension, to this interim cleanup action. In Everett, the applicable requirements are implemented through the City's Public Works permit process. Section 4.2 (Applicable Permits) addresses how the substantive requirements will be met in the design implementation of the interim cleanup action.

Asarco will require access to property that it does not own to complete the interim action. In the vicinity of the fenced area, access to roadways and other public areas will need to be obtained from the City of Everett. Utility providers will also need to provide access to their systems or equipment during the cleanup. Individual property owners will be asked to provide Asarco access to conduct residential remediation outside of the fenced area should this be implemented; this process is described in Appendix A.

3.4.3 Institutional Controls

The FCAP describes the Institutional Controls required for the residential properties adjacent to the fenced area. These will be implemented upon completion of the remediation of these properties, whenever that occurs. The institutional controls for the fenced area will be different than those specified in the FCAP. Because the fenced area is being remediated to the same standard as other residential properties, the Institutional Controls should also be the same as for other residential properties under the FCAP, with the exception that Asarco-owned property must have deed covenants to address future handling of any contaminated soil remaining on the property. These will be implemented after the cleanup of the fenced area is finished.

TABLE 3-4. EXCAVATION AND REMOVAL DESIGN ELEMENTS

Design Element	Issue to Address	How Issue is Addressed in Design
Area and depth of excavation	How large an area to excavate and to what depth?	Source and Residential areas divided into discrete excavation units. Size of areas based on production of 750 to 1,000 CY/day using conventional excavating equipment capable of over-the-road delivery and use. Layout and target depths will allow excavation to proceed in controlled manner while still allowing for unplanned excavation of Source material if is encountered outside of expected areas. Active excavation areas will be minimized, making dust control and ESC provisions more manageable.
Area and depth of excavation	How will debris be handled if encountered outside of S areas?	Debris will be considered S material. Three foundations on the west side of Pilchuck Path in the Upper area will be designated for debris stockpiling if debris is encountered in R areas. In the Lower area, almost all of the areas with R material will be excavated to remove S material first. As such, the likelihood of significant amounts of debris from R sites is low. However, a separate stockpile for debris will be established in the Lower area if needed.
Slope Stability	What are the provisions for cut slopes to assure safe excavation?	Previous investigations and Ecology's work in this area show that material can be excavated without excessive slope-back for stability. Shallow cuts (up to 4 ft.) may extend vertically while deeper excavations will need to be sloped back about 1:1. Trenches will be avoided and the contractor will be allowed to cut back or otherwise reduce side slopes as needed based on conditions encountered. Protection from direct rainfall and runoff on cut slopes will be implemented via temporary sheeting or surface water diversions.
Slope Stability	Final site grading.	The existing fenced area topography has several terraced areas running north/south and has a general slope of about 1V:10H across the site from west to east and north to south. The post-cleanup topography will match existing elevations along Hawthorne St., East Marine View Dr., and at the southern limit of the fenced area. Final elevations will generally be lower across the site and the north/south slope will be decreased toward the northern end of the fenced area. The overall site will have a general slope about 1V:10H from west to east after remediation and will be graded so steeper transitions will be nominally 1V:3H.

TABLE 3-4. EXCAVATION AND REMOVAL DESIGN ELEMENTS (continued)

Design Element	Issue to Address	How Issue is Addressed in Design
Cross-contamination	How will S and R material be kept from contaminating other areas, particularly those already remediated?	The excavation sequence is based on a “top down” approach across the site with removal of S material occurring before R material. Source area boundaries extend beyond the neat-line limit established during the smelter area investigation to allow for variations in the distribution of S debris and material. Separate stockpiles for S and R materials will be established. Segregation of the site into clean, R, and S areas with traffic control and decontamination stations between areas will limit potential cross-contamination. Surface water controls will be established to route runoff away from disturbed areas and to avoid runoff from S areas flowing across R or clean areas.
Surface Features	How will surface features be addressed?	Surface features include: vegetation and sod layer; concrete foundations; roads/road base; underground and overhead utilities. They will be addressed as shown in Table 3-5.
Confirmation at excavation depth	How will confirmation of cleanup levels be achieved? What if further excavation is needed?	Confirmation sampling is planned as described in Appendices A and C of this IAR. The general approach for material that fails confirmation testing is to excavate another discrete interval (e.g., 4 – 6 inches) across the sub-area rather than implement a complex and time consuming sampling plan to chase “hot spots”. Simply removing another depth interval and retesting provides the best assurance that any material remaining above the cleanup level is removed. This approach may be modified if it is clear that a smaller area is probably the source of higher concentrations (i.e., debris or residual by products) is visually evident and can be excavated and retested without the need for excavating the entire sub-area.
Decontamination	How will contamination be controlled beyond the fenced area?	Separate clean and contamination zones will be established at the site and people/equipment subject to decontamination before they exit the contaminated zone. Trucks or other equipment that moves off-site will be subject to tire washing before they leave the site. Trucks and containers containing S or R material will be covered when they leave the site and during transportation. Decontamination of this equipment will occur before it is released for other tasks. Decontamination procedures will be part of the specifications; for S and R materials it will generally include water wash to remove residual soil and/or physical removal (e.g., brooming, high pressure/low volume washing) to assure appropriate decontamination.

TABLE 3-4. EXCAVATION AND REMOVAL DESIGN ELEMENTS (continued)

Design Element	Issue to Address	How Issue is Addressed in Design
Stockpiling	Where and how will material be stockpiled on-site?	<p>Stockpiling of materials will be needed prior to loadout and transport to Tacoma. Three different types of stockpiles may be used:</p> <ul style="list-style-type: none">✓ Day piles – either S or R materials will be temporarily stockpiled in areas of the same type of material (i.e., no S material in an R sub-area) before loading to truck or container for transport later in the day. These piles should be less than 500 CY capacity.✓ Accumulation piles – these are larger stockpiles (up to 2,500 CY) that may be used to aggregate sufficient volume to allow the S or R material to be transported and loaded to a barge in one 12 – 14 hour period.✓ Debris piles – these areas will use existing foundations on the west side of Pilchuck Path for the Upper area and other foundations not yet excavated in the Lower area to collect smelter debris and residuals encountered in the excavation of R areas. They should be about 50 CY capacity. The existing shed at the north end of Pilchuck Path may also be used for this purpose if needed. <p>All stockpiles will have appropriate surface water diversion and ESC measures (i.e., City of Everett requirements) as part of their construction and operation and will be covered at the end of each work day. Specifications for these stockpiles will be included as part of the final design package.</p>

TABLE 3-5. UNIT OPERATIONS SUMMARY– EVERETT SMELTER

Unit Operation	Description of Operation and Alternatives
Clearing & Grubbing	<u>Vegetation and sod layer:</u> trees and shrubs within the fenced area will be removed and sent for off-site disposal at a permitted Subtitle D facility. The surface sod layer in R areas will be included with R soils for disposal at the Tacoma smelter. Surface sod in S areas will be stockpiled separately from other S material and sent for disposal at a Subtitle C facility.
Foundation/Road/Utilities Demolition	<u>Concrete foundations:</u> these will be removed from S and R areas and handled in the same manner as the soils from the areas in which they are currently located. Crushing and other size reduction, if needed, will occur at the Tacoma smelter. The potential for decontaminating foundations in S areas so this material can be treated as R soils is not ruled out; a separate decontamination plan will be prepared if this becomes necessary due to space constraints in the Tacoma OCF. <u>Roads and road base:</u> asphalt will be removed and recycled as it should not have any metals content of concern. Road base material will be removed from S and R areas and handled in the same manner as the soils from the areas in which they are currently located. <u>Underground and overhead utilities:</u> material will be removed and, if requested by the utility owner, decontaminated (if possible), and returned to them. Otherwise, these systems will be treated handled in the same manner as the soils from the areas in which they are currently located. Disposal will be at a Subtitle D facility for R material and a Subtitle C facility for S material.
Excavate & Load to Stockpile	Excavation is anticipated to use conventional equipment (e.g., CAT 300 series excavator nominal). More than one excavator may be used if space allows, particularly in deeper excavations. Production is anticipated to be about 750 – 1,000 TPD. The excavator(s) will load to 10 CY nominal dump trucks for transfer to stockpiles unless they are proximate enough to load to stockpile directly. Alternatively, excavators may load containers that will subsequently be transported to the Tacoma smelter.

TABLE 3-5. UNIT OPERATIONS SUMMARY– EVERETT SMELTER (continued)

Unit Operation	Description of Operation and Alternatives
Stockpile	<p>Three options are available:</p> <ul style="list-style-type: none">✓ Day piles – either S or R materials will be temporarily stockpiled in areas of the same type of material (i.e., no S material in an R sub-area) before loading to truck or container for transport later in the day. These piles should be less than 500 CY capacity.✓ Accumulation piles – these are larger stockpiles (up to 2,500 CY) that may be used to aggregate sufficient volume to allow the S or R material to be transported and loaded to a barge in one 12 – 14 hour period.✓ Containers – the option of using shipping containers capable of containing and transporting soil may be available; these are typically the size of standard shipping containers and can handle up to 20 tons \pm. These can either be loaded from a day pile or directly from the point of excavation. <p>Stockpiles need to be worked and shaped by a loader and will be covered at the end of each workday.</p>
Loadout & Transportation to Tacoma	<p>Loadout and transportation to Tacoma may occur via any or all of the following methods:</p> <ul style="list-style-type: none">✓ Load from either day or accumulation piles via front end loader to 10 CY end dump trucks and transfer to bulk barge for transportation to Tacoma. The 10 CY trucks would dump onto the barge and another loader would shape the material for shipment. Appropriate decontamination, containment, and spill control measures would be in place throughout barge loading. Covered barges containing 2,500 – 3,000 tons of material would be towed to the Tacoma smelter.✓ Loadout of containers to barge is similar to the previous method except that a crane would probably be required to place the container on a truck for short-haul to the barge loading area, where another crane would place the container on the barge.✓ Loadout from stockpiles to 30 ton (nominal) “truck and pup” over-the-road trucks and transport to the Tacoma smelter via road. A front end loader would load the truck.

TABLE 3-5. UNIT OPERATIONS SUMMARY– EVERETT SMELTER (continued)

Unit Operation	Description of Operation and Alternatives
Unload & Stockpile at Tacoma, Decon	<p>Unloading at the Tacoma smelter is essentially the reverse of the previous unit operation:</p> <ul style="list-style-type: none">✓ Bulk barge unloading would require a front end loader to fill 10 CY trucks on the barge which would then transport the material to the next operation. The large amount of debris expected with S material makes unloading using a hopper and conveyor impractical. Appropriate precautions during loading and transfer would need to be in place.✓ Container unloading would require a crane, transfer truck, and tipping bed to unload the soil from the container. The truck would then transport the container back to the barge to be reloaded by the crane.✓ Unloading 30 ton over-the-road trucks is readily accomplished by the truck lift-bed and no further assistance is needed. <p>If possible, unloaded material will be immediately processed to achieve the appropriate size followed by direct placement. If material will be stockpiled, it will either be in the Fine Ore Bins (FOB) for S material or with other residential soil stockpiles for R material. Decontamination following delivery of the final shipment for each container will be accomplished at the Tacoma smelter.</p>
Size S or M material	<p>Source material must be less than 6 inches to be placed in the Tacoma OCF; R material must be less than 3 inches for placement below the site-wide cap. Material that needs to be sized will be screened and/or crushed at Tacoma after delivery. If material meets the size requirements upon delivery then it may be able to be placed directly.</p>
Place S or M material	<p>Source material that is appropriately sized can be placed in the OCF provided it passes the “paint filter test”. As this material is being received essentially dry, this requirement should easily be satisfied. Residential material that is the appropriate size and meets the other requirements for sub-grade backfill can be placed below the sitewide cap.</p>

4.0 CONSTRUCTION ACTIVITIES

4.1 CONSTRUCTION MANAGEMENT

This section describes the construction management organization and structure and defines key positions and related responsibilities for the Everett site interim action. A table of functional descriptions for key positions, qualifications for key personnel, descriptions of duties, and lines of authority is included (see Table 4-1). The interrelationships between Asarco, Ecology, and the City of Everett are also described.

Project objectives for design and implementation of the interim action are listed below.

1. Conduct all design and interim action construction activities in the most cost efficient manner practical while fully complying with applicable regulatory requirements.
2. Regularly communicate the status of the project to the public, Stakeholders, agencies, and to others upon request.
3. Complete the project on-time and within budget.
4. Minimize, to the extent practical, disruptions or inconveniences that may be necessary to accomplish the site interim action by consulting and coordinating field activities with the neighboring public, local governments, and state/federal agencies.
5. Institute appropriate work practices and policies to produce high quality work products that meet the task requirements.
6. Coordinate related off-site work including transport to and stockpiling/disposal at the former Tacoma smelter site to achieve cost effective and environmentally satisfactory results for both sites.
7. Complete protection monitoring and performance monitoring in accordance with WAC 173-340-410.
8. Institute the necessary health and safety measures to assure acceptable public and worker protection during all interim action activities in accordance with WAC-173-340-810.

9. Establish project management systems, including policies, procedures, organizational descriptions, and cost control practices, that allow Asarco to achieve project objectives.
10. Develop workable, efficient practices for document review and revision by all parties that will participate in this project, including applicable state requirements for professional engineering approval of plans and specifications.

The work tasks to be performed during interim action are divided into four functional areas. Each functional area is comprised of one or more entities that are responsible for the assigned tasks:

1. Project Direction and Regulatory Oversight: Asarco and its legal counsel (Heller, Ehrman, White, & McAuliffe), Ecology, and City of Everett.
2. Project Management, Construction Management, Administration, and Control: Project Manager - Asarco Consulting, Inc.
3. Design and Field Engineering: The remedial design team and additional engineering expertise and inspectors as needed to support implementation of the interim action. The field engineering team includes the monitoring team responsible for protection monitoring and performance monitoring as described in WAC 173-340-410.
4. Construction: The Contractors and other subcontractors as needed to implement the cleanup as designed.

As the name implies, the Project Direction and Regulatory Oversight group is responsible for the overall project direction and regulatory compliance. The other functional groups are responsible for project management and execution consistent with the direction provided by Asarco, Ecology, and the City of Everett. The general tasks assigned to these functional groups are summarized below.

Project Management, Construction Management, Administration, and Control is the responsibility of the Project Manager. Functional tasks assigned to the Project Manager are:

- a) Procurement;
- b) Construction Management and Oversight;

- c) Implementation of Decision Making Processes and Procedures for the interim action;
- d) Contract Administration;
- e) Contractor/Employee logistics and administration facilities;
- f) Cost and Scheduling;
- g) Evaluation of on-going work, value engineering proposals, design revisions, and “realtime” interpretation of results from field activities.

Design and Field Engineering responsibilities are delegated between three groups: the Remedial Design team, the Results team, and the Field Engineering team. The functional tasks for these groups are:

Remedial Design Team:

- a) Completion of the Remedial Designs and design support to the Field Engineering Team;
- b) Revisions to approved Remedial Designs as needed during the interim action;
- c) Preparation of construction plans and specifications in accordance with WAC 173-340-400; and
- d) Incorporation of the value engineering process into design.

Results Team:

- a) Field sampling and monitoring in coordination with the Field Engineering Team to complete performance monitoring as outlined in Appendix A, Compliance Monitoring Plan;
- b) Internal and external laboratory coordination;
- c) Data review and/or validation; and
- d) Data reporting in accordance with Appendix C, Sampling and Analysis Plan.

Field Engineering Team:

- a) Protection Monitoring - Environmental, Safety and Health (ES&H) monitoring and programs to meet the requirements of WAC 173-340-810. Protection monitoring is described in Appendix B, Health and Safety Plan;

- b) Performance Monitoring (WAC 1173-340-410) – Engineering inspections, construction monitoring and testing, and construction quality control to confirm the interim action has attained cleanup standards and met interim action goals. Performance monitoring is described in Appendix A, Compliance Monitoring Plan and will be further defined in the final design specifications;
- c) Engineering support to Construction Contractor;
- d) Preparation of as-built drawings;
- e) Field change recommendations to Remedial Design Team; and
- f) Field surveying/mapping.

Construction Contractor:

- a) Implementation of the interim action in accordance with project plans and specifications and WAC 173-340-400.
- b) Operation and maintenance of roads and utilities;
- c) Off-site traffic management/coordination;
- d) Surface water controls;
- e) Materials management:
 - On-site transportation and stockpiling of Everett S and R material and import material; and
 - Coordination of material logistics, storage, preparation, stockpiling, and final disposal for imported and exported materials.
- f) Personnel monitoring per the Health and Safety Plan (Appendix B).

Figure 4-1 shows the project organization for accomplishing the interim action. The functional positions, reporting authority, and personnel assigned for the interim action are described in Table 4-1. Additional personnel will be assigned to perform specific tasks under the supervision of the key positions shown. The Remedial Design team is not addressed in detail here.

Changes to scope, schedule or cost will require coordination with the Project Coordinator, Project Manager, and interim action Contractor and may also require coordination with the

Remedial Design team if significant design changes are needed. An open line of communication between all functional groups will be established during the interim action to facilitate efficient change management during construction.

Design changes that are material to the Final Design will be documented with changes to Plans and Specifications which will be submitted to Ecology for review and approval.

TABLE 4-1 FUNCTIONAL ORGANIZATIONAL DESCRIPTION

Key Functional Positions	Project Reporting Relationships	Primary Duties and Responsibilities	Personnel Assigned
Asarco Project Coordinator The Project Coordinator is responsible for overall project direction and control. The Project Coordinator establishes the performance criteria for project deliverables (scope, schedule, cost, quality and compliance) which in turn are delegated to the Project Manager for implementation. The Project Coordinator is responsible for strategic and legal direction involving project execution and is the formal point of contact for regulatory agencies and the Community Stakeholders.			
Asarco Project Coordinator	Reports directly to the Asarco manager responsible for these projects within the corporation.	Direction and control of project to fully satisfy regulatory requirements while controlling project costs and schedule.	Donald A. Robbins, ASARCO Incorporated
Legal Direction	Reports to Asarco Project Coordinator and Asarco Executive Management.	Responsible for legal aspects of project, providing routine direction, review, and support to Project Coordinator and Supervising Contractor.	Michael R. Thorp Marcia Newlands Heller, Ehrman, White & McAuliffe (HEWM)
Contracts Manager	Reports to Asarco Project Coordinator and Asarco Executive Management	Responsible for contract review and approval, provides direction relative to contract terms, review and approval of contract changes, provides support to the Project Manager relative to contract issues.	Robert Litle ASARCO Incorporated
Asarco On-site Representative	Reports directly to the Asarco Project Coordinator and indirectly to the Project Manager	Responsible for on-site coordination of daily construction activities and public interaction.	Clint Stanovsky Consultant for ASARCO Incorporated

TABLE 4-1 1 FUNCTIONAL ORGANIZATIONAL DESCRIPTION (continued)

Project Manager The Project Manager is responsible for overall project management and execution, and is accountable for all project deliverables regarding scope, schedule, cost, quality and compliance. This position is responsible for construction management and implementation of all interim action activities including protection monitoring, performance monitoring, materials management, operations & maintenance, contractor management, field engineering, and construction quality control. Cost management, scheduling and coordination with regulatory agencies and community groups are also the responsibility of the Project Manager.			
Project Manager	Reports directly to Asarco Project Coordinator.	The Project Manager is responsible for management and execution of the project consistent with authority delegated by the Asarco Project Coordinator. This position is accountable for all project deliverables and project team performance regarding scope, schedule, cost, quality and compliance. The Project Manager supports other team positions to ensure that resource issues are met, decisions are made, and project needs are met. The Project Manager is the primary technical liaison between regulatory agencies, community groups, and the project team. The Project Manager will be a registered Professional Engineer in the State of Washington in accordance with WAC-173-340-400(6)(b)(i).	David K. Nation, P.E. Asarco Consulting, Inc.
Construction Contractor Responsible for construction and implementation of the interim action consistent with the project plans, specifications, and control documents in accordance with WAC 173-340-400.			
Construction Contractor	Reports directly to Asarco Project Coordinator.	The Construction Contractor is responsible for implementation of the interim action in accordance with project plans and specifications. The Construction Contractor will follow all protection monitoring requirements of the project as defined in the Health & Safety Plan, Appendix B. Construction management will include on- and off-site traffic management, site roads and utilities, dust control, and materials management.	TBA

TABLE 4-1 FUNCTIONAL ORGANIZATIONAL DESCRIPTION (continued)

Field Engineering/Construction Oversight This group is responsible for Protection Monitoring (Environmental Safety and Health), Performance Monitoring, field quality control, engineering inspections, surveying, monitoring/testing, and construction oversight/support. The Field Engineering/Construction Oversight Team includes the functions of regulatory mandated quality control of construction activities and project deliverables, field sampling and analysis oversight, monitoring oversight, data validation and management, environmental safety and health (ES&H) compliance, field construction changes, as-builts, and surveying.				
Field Manager	Engineering	Project Manager	The Field Engineering Manager is responsible for oversight of engineering activities and coordination with the Project Manager, On-site Representative, and Contractors during the interim action. This position will provide technical direction, guidance and support to all project groups, particularly the Field Engineering Team. This position will ensure that field results are evaluated in a timely manner to determine if project specifications and construction quality control criteria are being met. This position will provide real-time “in-the-field” guidance and direction to the Field Engineering Team to determine a course of action when requirements are not met. The Field Engineering Manager will coordinate with the Lead Design Engineer to obtain design support as needed to address field conditions, design changes, etc.	TBA
Engineering Inspector(s)		Field Manager	Engineering	The Engineering Inspector(s) will work with the Contractor in coordinating construction tasks to meet project requirements as designated in the project Plans and Specifications, Compliance Monitoring Plan, Sampling and Analysis Plan, and Health and Safety Plan. The Engineering Inspector(s) will also direct field engineering changes, develop as-built drawings, complete surveying, and provide general engineering support.
ES&H Officer	Compliance	Field Manager	Engineering	This position will direct the Environmental Safety & Health (ES&H) program in accordance with the requirements of WAC-173-340-810, Protection Monitoring. The ES&H Compliance Officer will develop and implement all ES&H programs required for the site, review Contractor safety plans, and provide oversight of contractor compliance with applicable programs. The ES&H Compliance Officer may observe any operation on-site report directly to the Project Manager as needed.

TABLE 4-1 FUNCTIONAL ORGANIZATIONAL DESCRIPTION (continued)

Results Team Responsible for coordination and tracking of project data, oversight of field sampling teams, laboratories coordination, validation of data as appropriate, and data results reporting to all project groups.			
Results Manager	Project Manager	Development, implementation, and tracking of all field sampling, analysis, and reporting activities including tasks performed by Asarco, field subcontractors, onsite XRF laboratory and Asarco TSC laboratory. This position will direct sampling teams and will coordinate and direct laboratories and testing subcontractors. The Results Manager will review laboratory and testing results and coordinate additional technical review with appropriate members of the Field Engineering/Construction Oversight team. The Results Manager reports and distributes results to all project groups in a timely fashion and identifies areas that are not in compliance with the Project Specifications, Compliance Monitoring Plan, or Sampling and Analysis Plan.	TBA
Sampling Teams	Results Manager and/or Lead Field Engineer	Sampling teams may be comprised of Engineering Inspectors, laboratory personnel, and construction/field personnel. The sampling team will be responsible for sample collection as defined in the Project Specifications, Sampling and Analysis Plan, and Compliance Monitoring Plan. The sampling team will complete Chain-of-Custody forms and other sample documentation as required.	TBA
Laboratory Supervisors	Results Manager	Responsibility for supervision of laboratory analyses performed during the interim action, consistent with the Project Specifications, Sampling and Analysis Plan and Compliance Monitoring Plan.	- Onsite XRF Laboratory - Asarco TSC - Salt Lake City, UT
Data Validation and Management	Results Manager	Data validation and management of information per the Sampling and Analysis Plan.	TBA

4.2 APPLICABLE PERMITS

This section describes the applicable permit requirements for the interim action and presents the plan for addressing the substantive conditions as provided for under MTCA.

4.2.1 REQUIREMENTS AND EXEMPTIONS

As discussed in Section 3.4.2, MTCA provides exemptions from the procedural requirements of several state laws applicable to the design and implementation of cleanup actions, though the substantive requirements of these laws must be met. Ecology's FCAP for the Upland Area of the Everett Smelter Site incorporates the substantive requirements of those state laws applicable to the cleanup action selected in the FCAP. Because the proposed interim cleanup action is consistent with and meets or exceeds the requirements of the cleanup action selected in the FCAP, the proposed interim action also complies with the substantive requirements of the applicable state laws.

Regarding applicable local laws regulating construction activities in the City of Everett, the FCAP notes that the City has substantive requirements for grading, erosion control, and work in City rights-of-way. The FCAP directs the Engineering Design Report (in this case, the IAR) for the selected cleanup action to specify the means of compliance with these substantive local requirements.

Further, MTCA 173-340-400(5) requires that:

Permits and approvals and any substantive requirements for exempted permits, if required for construction or to otherwise implement the cleanup action, shall be identified and where possible, resolved before, or during, the design phase to avoid delays during construction and implementation of the cleanup action.

4.2.2 LOCAL PERMITS AND APPROVALS

The City of Everett regulates site development and construction activities through two permit processes: the Public Works Permit, and the Industrial Waste Discharge Permit.

The Public Works Permit addresses grading, storm water control, landscaping and erosion control, work in public rights-of-way, emergency access and other aspects of improvements undertaken within the City of Everett. Once a permit application is initiated (through the Building Permits desk of the Department of Public Works), Public Works staff conduct an internal review of proposed construction plans, and route them for review by the Fire Department and the Utilities Division (the local water and sewer utility). According to Public Works staff, review times for projects similar to the proposed interim action are typically four to five weeks.

The Industrial Waste Discharge Permit sets standards and, when appropriate, pretreatment requirements for water discharged into the City's wastewater treatment system. Asarco has previously obtained this permit for water reporting to the City's system. Staff of the Everett Utilities Industrial Pretreatment Program review quantities and characteristics of water to be discharged from the construction site into the City's combined storm and sanitary sewer system. Staff may recommend specific testing, monitoring and pretreatment programs to assure the acceptability of discharges from the site. According to City staff, typical review times range from 1 week to 60 days (in cases where public notice is required).

Asarco anticipates that the existing local permit review processes can be employed to assure compliance with substantive requirements within the schedule necessary to begin work onsite in April 2003. This IAR will provide much of the information necessary for the City's permit review processes. Upon completion and acceptance of this report, Asarco will develop and submit its applications for both local permits. Requirements or conditions that may arise from these permits will be incorporated into the final plans and specifications.

4.2.3 Transportation Facilities

Asarco or its contractor(s) will need to comply with the federal, state and local permits governing the operation of any off-site intermodal facilities used in interim action, including barge loading facilities and, possibly, rail/container facilities. These permits will include City of Everett operating permits and NPDES permits.

Two barge-loading facilities in Everett could potentially be used in the shipment of contaminated soil to Tacoma, and to import clean fill to the site. Both facilities operate under Sand and Gravel Facility General (NPDES) Permits, which require a Stormwater Pollution Prevention Plan and a Spill Plan. These and other relevant requirements of the general permits will be reviewed, and may need to be modified to assure their adequacy for the handling of state dangerous and hazardous wastes.

Asarco or its contractor(s) will collaborate with transportation facility operators as necessary to develop suitable operations plans for the interim action.

4.3 QUALITY CONTROL AND DOCUMENTATION

Construction quality control and documentation requirements are specified in WAC 173-340-400 (4) and (6). Quality control requirements applicable to this IAR can be divided into two groups:

- Chemical-related parameters, which are addressed in the Compliance Monitoring and Sampling and Analysis Plans (Appendices A and C), and the Health and Safety Plan (Appendix B); and
- Physical parameters, such as percent compaction, which are addressed in the applicable ASTM test method that will be cited in the specifications.

These requirements are or will be incorporated into the construction management plan (Section 4.1) and the construction plans and specifications that will be prepared as part of the final design. As remediation of the fenced area progresses, documentation regarding the

execution of the interim action and variations from the remedial design will be prepared. Data management and reporting is addressed in Appendix C, Sampling and Analysis Plan.

This interim action is straightforward, so the type of information to be documented will primarily consist of the following items:

- Excavation limits, depths, and beginning and ending elevations;
- Volumes and quantities (tons) of material excavated and classification by type (S or R);
- Sample results from performance monitoring activities;
- Air quality monitoring information, both personal and ambient;
- Number of trucks loaded and daily quantities shipped off-site;
- Field and laboratory data for physical tests (e.g., compaction, grain size analysis); and
- Water quality information related to surface water that will be discharged.

This information will be compiled and reported to Ecology periodically throughout the interim action. It will be available for inspection during normal business hours. At the completion of both Stage 1 and Stage 2, as-built drawings will be prepared documenting these conditions:

- The excavated surfaces after removal of the S and R material before backfilling;
- The surface topography after cut and fill operations have been completed but before import of clean material;
- The final surface topography after clean material import and final grading; and
- The details of subsurface and overhead utility abandonments, relocations, or new services.

At the end of the interim action, this information for the fenced area will be compiled, organized, and submitted to Ecology and the City of Everett in a report. This report will be prepared under the direction of a professional engineer registered in Washington. This report may be used to update other public records and will provide the basis for the institutional controls program in the fenced area called out in the FCAP.

Procedures for collecting information and documenting the remediation of any residential properties outside the fenced area are contained in Appendix A.

4.4 OPERATION AND MAINTENANCE

The requirements of the Operations and Maintenance Plan in WAC 173-340-400 (4) (c) are intended for remediation activities that have some ongoing treatment or waste management activities. The actions planned under this interim action are primarily construction oriented. While there will be operational aspects associated with the cleanup of the fenced area, they will be ancillary to the overall construction activities that will be undertaken. The O&M provisions needed during the interim action will be included with the construction plans and specifications prepared as part of final design.

Because the interim action will remove material from the fenced area to residential standards established in the FCAP, no further O&M provisions beyond those required by the FCAP are anticipated after completion of the interim actions

5.0 REFERENCES

- Record of Decision, Commencement Bay Nearshore/Tideflats Superfund Site Operable Unit 02, Asarco Tacoma Smelter Facility, Ruston and Tacoma, Washington, U.S. Environmental Protection Agency Region 10, March 1995
- Everett Smelter Site Remedial Investigation, Everett, Washington, Hydrometrics, Inc. and Kleinfelder, Inc., September 1995
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- Smelter Area Investigation Report, Everett Smelter Site, Everett, Washington, ASARCO Incorporated, August 13, 1998
- Storm Water and Storm Drain Sediment Characterization and Controls Work Plan, ASARCO Incorporated, April 1998
- Everett Smelter Site Final Cleanup Action Plan (FCAP) and Final Environmental Impact Statement for the Upland Area, Everett, Washington, Washington State Department of Ecology, November 19, 1999
- Stormwater Management Manual, City of Everett, Revised 4/00
- Interim Actions, WAC 173-340-430 et al, Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, Washington State Department of Ecology Toxics Cleanup Program, Publication 94-06, Amended February 12, 2001
- Design and Construction Standards and Specifications for Development, City of Everett, Revision 4/02
- Standard Specifications for Road, Bridge, and Municipal Construction-2002, Washington State Department of Transportation

FIGURES